

storms were reported in the greatest number of states, 16, on the 12th and 13th; in 10 to 15 on the 1st to 6th, 11th, 12th, 16th, 18th, and 19th; and in 1 to 9 on the 7th, 8th, 9th, 15th, 17th, 20th to 27th, 29th, and 30th. The 28th and 31st were the only dates on which no thunder-storms were reported.

East of the Rocky Mountains thunder-storms were reported on the greatest number of dates, 16, in Iowa, and Mo.; on 10 to 15 in Ark., Fla., Ill., Kans., La., Mich., Ohio, and Tex.;

and on 1 to 9 in Ala., Conn., Ga., Ind., Ind. T., Ky., Me., Md., Mass., Minn., Miss., Mont., Nebr., N. H., N. J., N. Y., N. C., N. Dak., Pa., R. I., S. C., S. Dak., Tenn., Vt., Va., W. Va., and Wis. West of the Rocky Mountains thunder-storms were reported as follows: Ariz., 1st to 4th, and 10th; Colo., 1st, 11th, and 20th; Nev., 10th; N. Mex., 1st; Utah, 2d, 7th, and 11th; Wash., 16th; Wyo., 1st. No thunder-storms were reported in Cal., Del., D. C., Idaho, and Oregon.

ISLAND NAVIGATION.

STAGE OF WATER IN RIVERS AND HARBORS.

The following table shows the danger-point at the several stations; the highest and lowest water during October, 1890, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, October, 1890 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River.</i>						
Shreveport, La.	29.9	25, 26	7.3	13	5.5	1.8
<i>Arkansas River.</i>						
Port Smith, Ark.	22.0	25	11.2	6	4.2	7.0
Little Rock, Ark.	23.0	27	12.4	8	7.8	4.6
<i>Missouri River.</i>						
Port Buford, N. Dak.		10, 11	1.5	30, 31	0.4	1.1
Sioux City, Iowa		2	4.5	20	3.6	0.9
Kansas City, Mo.	21.0	16	4.5	30, 31	3.1	1.4
<i>Mississippi River.</i>						
Saint Paul, Minn.	14.5	20 to 22	2.6	6	1.6	1.0
La Crosse, Wis.	13.0	20	6.3	9, 10, 11	3.4	2.9
Dubuque, Iowa	16.0	25	7.6	10, 11	3.9	3.7
Lavenport, Iowa	15.0	20 to 28	4.9	12, 13	2.3	2.6
Keokuk, Iowa	14.0	29, 30	4.8	14, 15	2.2	2.6
Saint Louis, Mo.	32.0	22	9.4	17	6.7	2.7
Cairo, Ill.	40.0	31	18.1	20	11.4	6.7
Memphis, Tenn.	34.6	1	14.6	22	8.8	5.8
Vicksburg, Miss.	41.0	2	22.9	26	13.0	9.9
New Orleans, La.	13.0	6	6.4	28, 29	4.2	2.2
<i>Ohio River.</i>						
Pittsburgh, Pa.	22.0	25	16.2	1	4.8	11.4
Parkersburg, W. Va.	38.0	27	23.2	4	6.9	16.3
Cincinnati, Ohio	50.0	30	32.9	1	12.0	20.9
Louisville, Ky.	25.0	30	12.2	1, 2	6.3	5.9
<i>Cumberland River.</i>						
Nashville, Tenn.	40.0	4	11.4	22	3.3	8.1
<i>Tennessee River.</i>						
Chattanooga, Tenn.	33.0	27	9.5	16, 17, 18	3.7	5.8
<i>Monongahela River.</i>						
Pittsburgh, Pa.	29.0	25	16.2	1	4.8	11.4

Heights of rivers—Continued.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Savannah River.</i>						
Augusta, Ga.	32.0	1	28.5	16	7.1	21.4
<i>Willamette River.</i>						
Portland, Oregon.	15.0	2	2.7	8	0.2	2.5

FLOODS.

Reports of the 12th show that great damage was caused to crops, railroad, and other property in West Virginia by freshets in the Monongahela and Little Kanawha rivers and tributaries. At Glenville, W. Va., the Little Kanawha had risen 25 feet by the 13th, washing away large quantities of hay, corn, and lumber. At Parkersburgh, W. Va., the Ohio River rose 11 feet from the 13th to 15th, on which latter date it stood 21.1 feet on the gauge. The Connecticut River was unusually high on the 21st. The Roanoke River was rising rapidly at Weldon, N. C., on the 23d; on the 25th the water covered low ground; and on the 26th the water began to recede. A freshet was reported on the 26th in the Wyoming Valley, in the Susquehanna River basin, Pa. On the 29th high winds, together with a freshet, caused the Cape Fear River to flood its banks near Wilmington, N. C., inundating rice fields, sweeping away rice stacked in the fields, and flooding lower floors of stores on Water street in Wilmington. At Mossing Ford, Va., the excessive precipitation of the month caused the overflow of small streams.

MISCELLANEOUS PHENOMENA.

SUN SPOTS.

Haverford College Observatory, Pa., (observed by Prof. F. P. Leavenworth):

Date.	Number of new—		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		Faculae.	Remarks.
	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.		
Oct., 1890.										
1, 9 a. m.	0	0	0	0	0	0	1	28	0	Definition fair; spots small.
2, 11 a. m.	0	0	0	0	0	0	0	0	0	Definition fair.
3, 10 a. m.	1	12	0	0	0	0	1	2	5	Definition good.
4, 10 a. m.	1	12	0	0	0	0	1	14	2	Definition good; spots small.
5, 3 p. m.	0	0	0	0	0	0	1	1	2	Definition good; spots small.
6, 9 a. m.	0	0	0	0	0	0	1	1	2	Definition fair.
7, 10 a. m.	1	4	0	0	0	0	2	8	2	Definition fair.
8, 10 a. m.	0	0	0	0	0	0	1	2	1	Definition poor.
9, 10 a. m.	0	0	0	0	0	0	0	0	2	Definition poor.
10, 9 a. m.	0	0	0	0	0	0	0	0	0	Definition fair.
11, 10 a. m.	0	0	0	0	0	0	0	0	1	Definition good.
12, 10 a. m.	1	56	0	0	0	0	1	50	...	Definition partial through clouds.
13, 9 a. m.	0	0	0	0	0	0	1	40	1	Definition poor; large double spot.
14, 9 a. m.	0	0	0	0	0	0	1	24	0	Definition fair.
15, 9 a. m.	0	0	0	0	0	0	1	8	2	Definition poor.
16, 2 p. m.	0	0	0	0	0	0	1	16	3	Definition poor.
17, 2 p. m.	0	0	0	0	0	0	1	2	3	Definition fair.
18, 10 a. m.	0	0	0	0	0	0	1	4	3	Definition fair.

Mr. D. E. Hadden, Alta, Iowa: 1st, 1 group, 2 spots; small faculae nw. 2d, faculae on nw. limb. 6th, 1 group. 14th, faculae near w. limb. 16th to 18th, clear disc. 19th, 1 group, 3 spots on se. limb, with faculae. 20th, 1 group, 6 spots; 3 new spots, and group of faculae on e. limb. 21st, 1 group, 6 spots, 3 spots large, with faculae surrounding. 22d, 2 groups, 11 spots. 23d, 2 groups, 17 spots; 1 spot large, and the others small. 24th, 2 groups, 15 spots. 25th, 1 group, observation incomplete, clouds. 26th 1 group, 1 large spot; could not count spots, hazy. 30th, 1 group, 2 spots; faculae in nw. 30th, 1 spot disappearing by rotation on w. limb; hazy. Cloudy on 3d, 5th, 8th, 13th, 15th, 27th to 29th.

Mr. John W. James, Riley, Ill.: 1st, one new group near west edge. 3d, no spots seen, but broad areas of faculae on west limb. 7th to 17th, observations on 7 days but no spots seen. 19th, faculae on east edge, followed on 20th by a fine large group, estimated 52,600 miles long, one large spot 26,300 miles diameter, and about 20 small spots. 24th, a new group southeast of large spot. 27th, all the small spots gone; faculae in their place; the large spot, still intact, disappeared by solar rotation November 1st.

Mr. C. E. Buzzell, Leaf River, Ill.: 6th and 7th, small group in south latitude. 14th, small spot in south latitude near meridian. 19th, large group at east limb which completed the transit. Observations not taken on many dates on account of clouds.